assessed in this investigation. The seeds were treated with the three different fungicide solutions (distilled water in the case of the control) for 5 h after an initial 10 min treatment with 1% NaOCl (w:v) and rinsing with three successive applications of sterile distilled water. The proliferation of bacteria was minimised by the addition of chlorohexidine gluconate (Hibitane®) to the fungicide solutions. The viability of the treated seeds after different storage periods was assessed and the effectiveness of the fungicides to curtail fungal proliferation was evaluated. The data from this study show that loss of viability occurred within 32 d for seeds stored hydrated following NaOCl treatment only, while those seeds treated with the three different fungicides retained some viability even after 64 d in hydrated storage, with Orius (tebuconazole) emerging as the most efficacious. Two different concentrations of tebuconazole (5 and 1 g l^{-1}) were used to treat *T. dregeana* seeds before hydrated storage. When the seeds were removed from the fungicide treatments, a discolouration was observed in those treated with the higher concentration of Orius, yet ~60% of these seeds germinated after 64 d of hydrated storage. Fungal proliferation in storage was apparent only on the control (water-soaked) seeds, occurring within 8 d. However, when axes from seeds from the different fungicide treatments were cultured on a nutrient medium, fungal persistence was still apparent, but the species proliferating (one each after Heritage and Celest treatment and two following Orius application) were different, depending on the fungicide applied. Shoot development in the axes from the three fungicide treatments was rapid: In contrast, no shoot development occurred from axes of untreated seeds over a 6-week culture period. Progress towards obtaining axenic (pure) isolates of the fungal species associated with the cultured axes from the different treatments is currently underway. It therefore appears that systemic fungicide treatments of recalcitrant seeds have the potential to improve hydrated storage longevity of *T. dregeana* seeds, but, to eliminate all the fungal inoculum, must be tested in various combinations and concentrations.

doi:10.1016/j.sajb.2007.04.045

Cryostorage of callus produced during indirect organogenesis in *Eucalyptus grandis*×*urophylla*

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The South African Forestry industry forms an essential part of the economy of the country. *Eucalyptus* species are mainly planted in low altitude areas of KwaZulu-Natal and Mpumalanga and are used for timber, pulp and paper production, poles and firewood. Members of the genus are also used commercially for the production of essential oils and tannins which are extracted from leaves. The industry invests considerable effort in research towards increased plantation yields and, as a result, micropropagation approaches are now routinely used to support clonal programmes. *In vitro* conservation is presently an active area of research and this study established the successful use of organogenic callus in cryopreservation of the germplasm. An indirect organogenesis technique developed in our laboratories was used to produce propagules of a *Eucalyptus grandis*×*Eucalyptus urophylla*. Assessment of developmental processes in this material focused mainly on identifying callus origin, the vascular connection between callus and shoots and the shoot-root junction. The histological development over a two month period will be described. Identification of the cells that are responsible for initiation and differentiation of callus can also assist in determining the appropriate micropropagatory developmental stages for cryostorage. Using this approach it was established that 52–55% of callus (22 days old) that was prepared for cryostorage by drying to a water content of 49–56% (wet mass basis), exposed to cryoprotectants (dimethyl sulphoxide and sucrose) and then slowly frozen (±1 °C/min) was viable after thawing. Collectively the data add to our growing understanding of the biological processes underlying both micropropagation and cryopreservation of *Eucalyptus*.

doi:10.1016/j.sajb.2007.04.046

Chlorophyll fluorescence and CO_2 assimilation of desiccation-tolerant cyanobacterial crustaceous layer of tropical inselberg rock surfaces after rehydration following one and four-year air-dried stage

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Changes in chlorophyll fluorescence and net CO_2 assimilation were studied in previously air-dry desiccation-tolerant inselberg cyanobacterial crustaceous layers from two tropical locations, after various periods of time. The cyanobacterial crustaceous layers on granatic inselberg rock surface from Tanzania and on gneissic inselberg rock surface from French Guayana were studied. Photosynthetic $C0_2$ assimilation rates